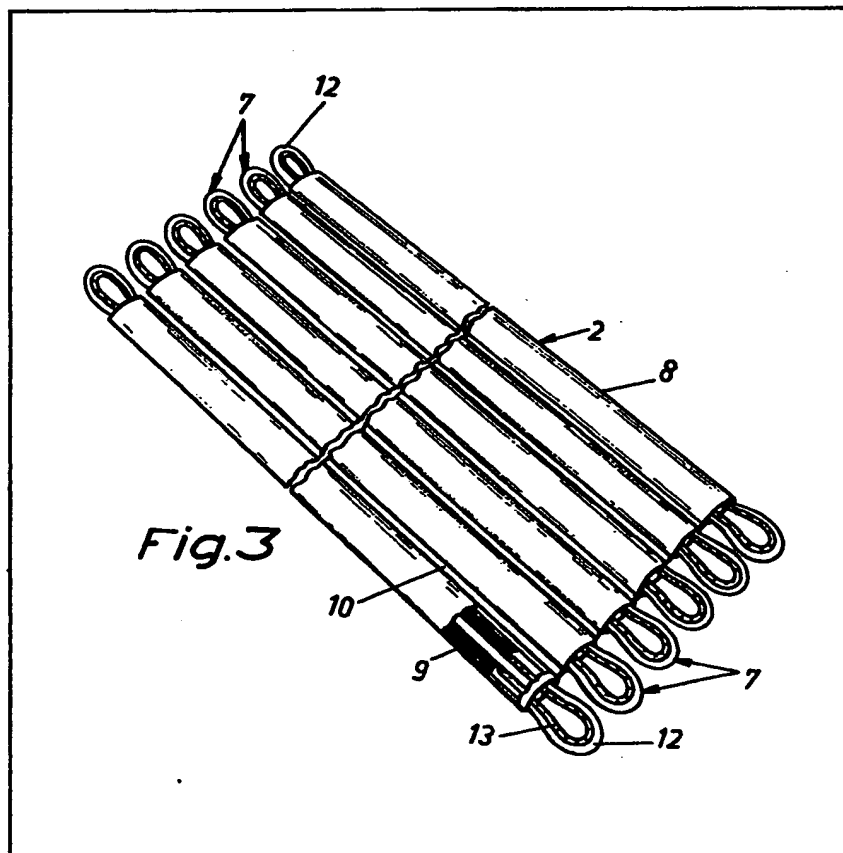


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(71) Applicants
Svensk Lasthantering
Bengt Lindahl AB.,
Östergårde
Industriområde, S-423 00
Torslanda, Sweden
(72) Inventor
Bengt Evert Lindahl
(74) Agents
F. J. Cleveland &
Company

(54) Lifting mats

(57) A lifting mat, particularly designed to lift large cylindrical objects comprises a number of slings which are positioned side by side, each one of said slings consisting of an elongate loop of parallel strands 9 extending inside an individual sleeves. A portion of each loop protrudes from its sleeve at each end thereof. These protruding portions are individually enclosed by protective coverings 12 and form lifting loops 7.

The lifting mat in accordance with the invention is less expensive to manufacture than prior-art lifting mats while at the same time they are more wear-resistant and easier to handle.



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Fig.1

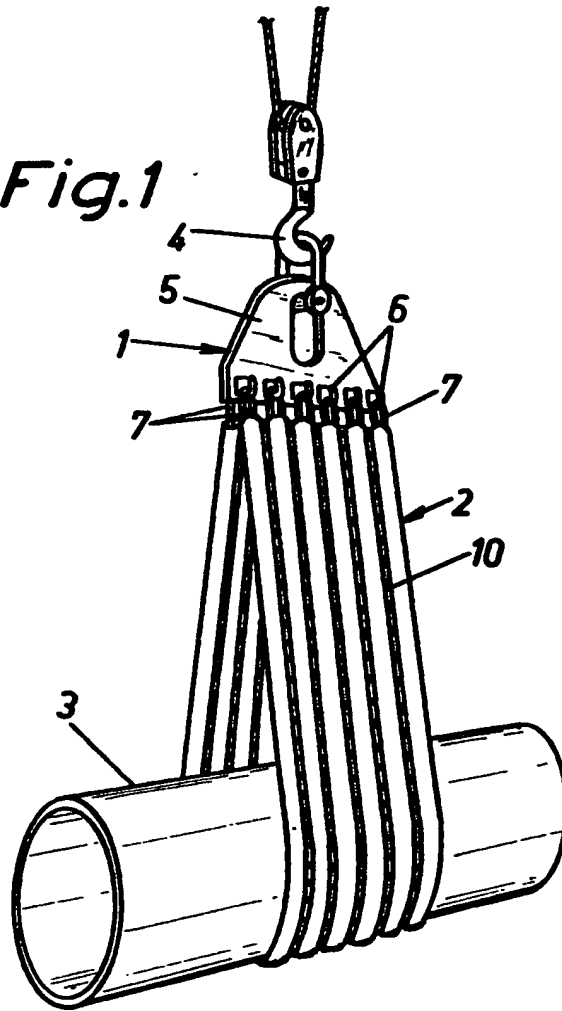


Fig.2

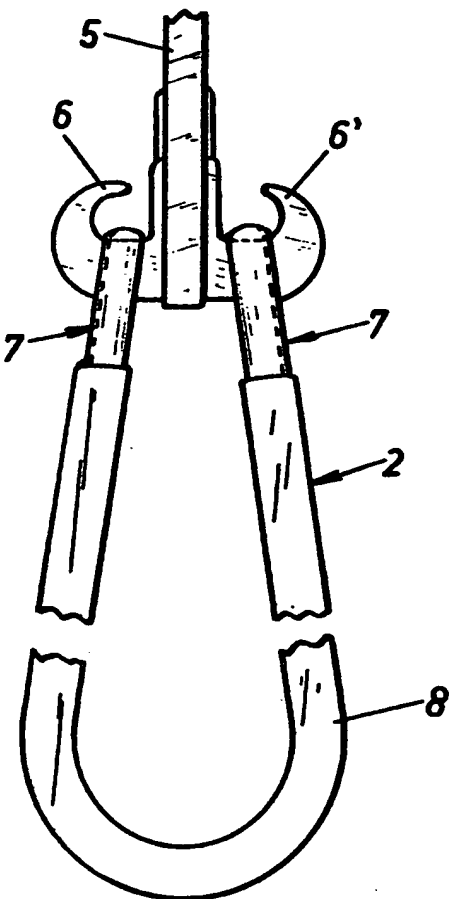


Fig.4

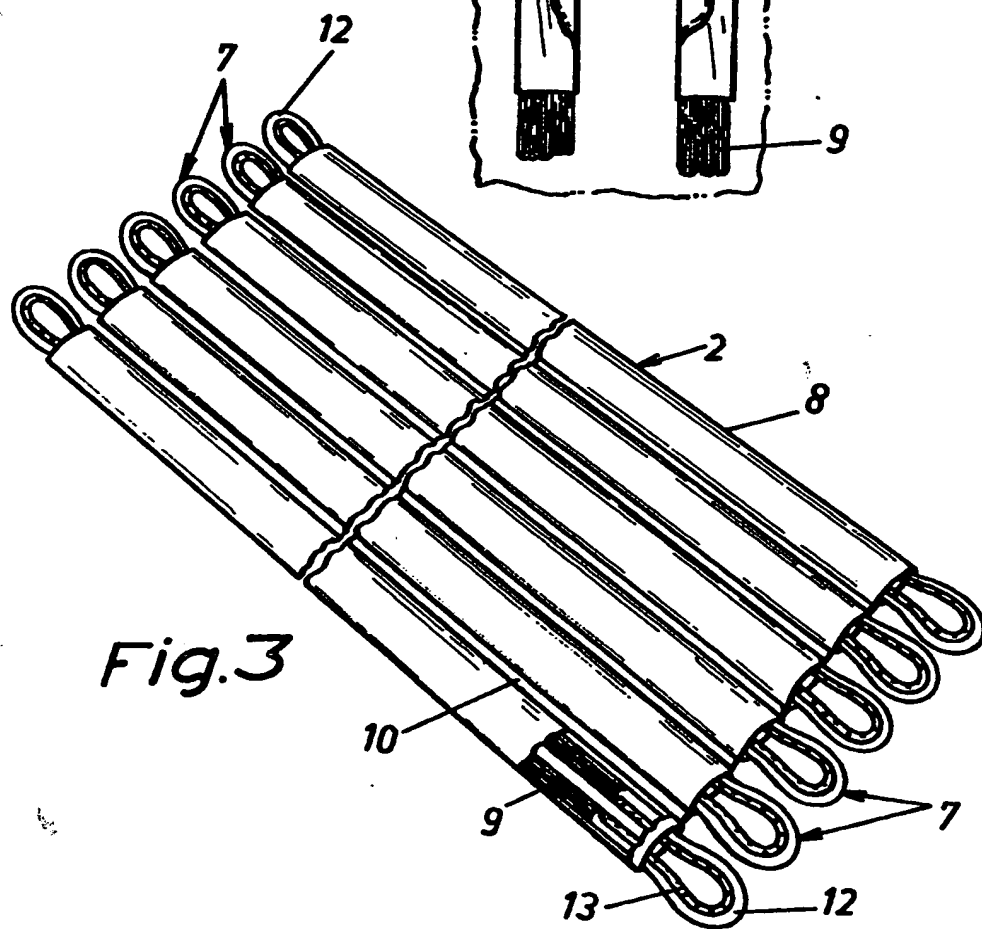
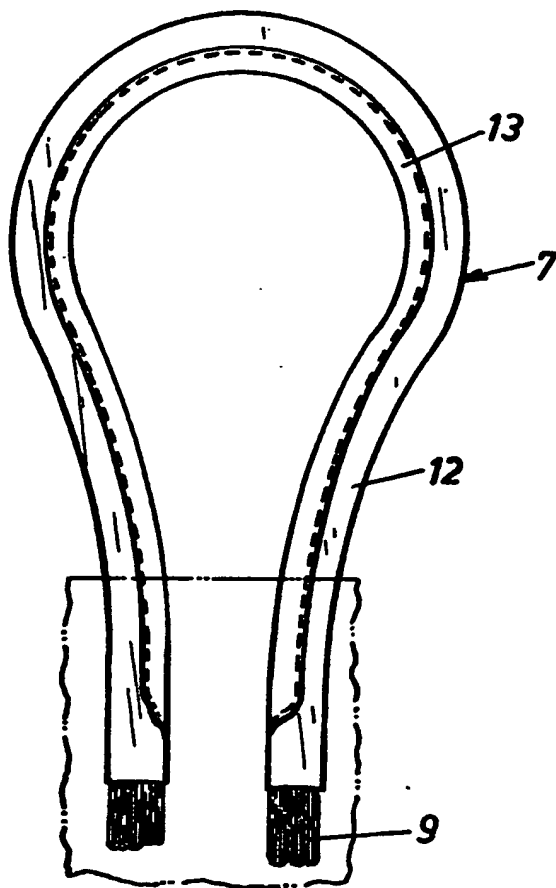


Fig.3

Fig. 5

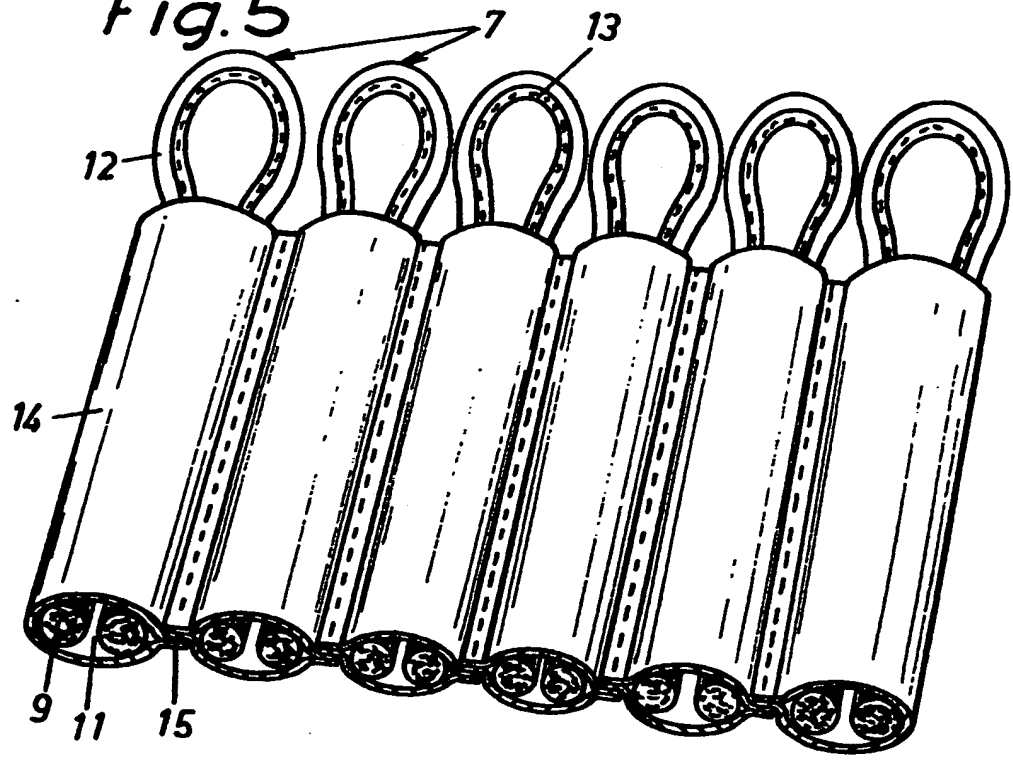
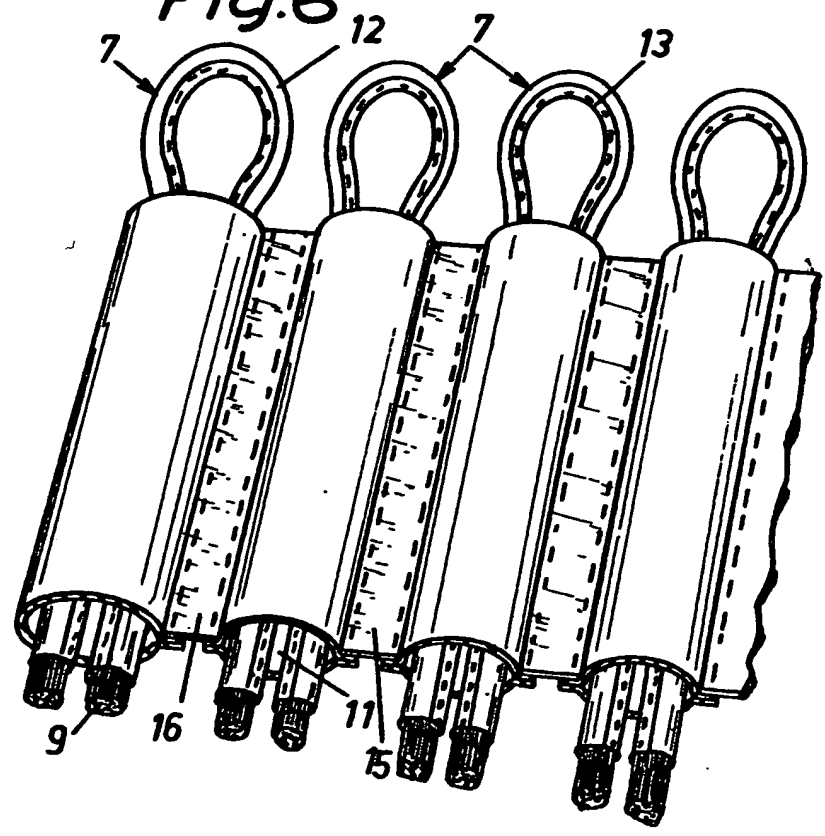


Fig. 6



SPECIFICATION

A lifting sling, in the shape of a mat, particularly for lifting cylindrical objects

5 The subject invention concerns a lifting sling in the form of a mat which is particularly designed to lift cylindrical objects, such as pipes or rollers.

Lifting mats of this kind are used when it is desirable to distribute the lifting stress over a large area of engagement to avoid deformation of the lifted object. At the same time lifting with the aid of a mat improves the balance of the lifted object supported in the lifting mat compared with when conventional roundslings or web straps are used.

When large cylindrical objects being lifted, it is therefore common practice to use lifting mats consisting of two or several woven and comparatively thin fibrous webs which are positioned side by side. At their ends, the woven fibrous webs are interconnected by means of a lifting element, so as to form a lifting mat.

When lifting means of this kind are used, e.g. when drainage pipes or pipelines are deposited in the ground, the fibrous straps, and quite particularly the load-carrying warp threads therein, are exposed to extreme wear owing to their direct contact with the lifted objects as well as with earth, gravel and water. In addition, lifting means of this type are difficult to handle when the web ends are to be connected to the end lifting elements, since some kind of locking arrangement is necessary.

The subject invention provides a lifting mat which possesses a higher lifting capacity than conventional lifting means of comparable weight, and which is more simple to handle and more resistant to wear than are prior-art lifting mats. In addition, the lifting mat in accordance with the invention does not require locking means to attach the lifting mat to a lifting element.

The lifting mat in accordance with the invention is also cheaper to manufacture than are lifting mats of conventional design which consist of woven fibrous straps the ends of which must be attached to the strap to form lifting loops. The requirements on strength on such joints are considerable and they are therefore often provided with reinforcement means.

The lifting mat in accordance with the invention is characterised in that it is composed of two or several slings which are positioned side by side, each such sling consisting of an elongate loop of parallel threads and extending inside its individual channel, which channels are formed by a wrapping enclosing the slings, a portion of each sling protruding from its respective channel at each channel end, said protruding portions being individually enclosed by protective coverings and forming lifting loops.

The invention will be described in closer detail in the following with reference to the accompanying drawings on which are represented several embodiments of the inventive object. In the drawings,

Fig. 1 shows the lifting mat in accordance with the invention while in use,

Fig. 2 is an end view of the lifting mat together with its lifting element,

Fig. 3 shows the lifting mat in extended position in a broken perspective view,

Fig. 4 illustrates a lifting loop on an enlarged scale and

Fig. 5 and 6 show a part of the lifting mat in accordance with two different embodiments thereof.

The lifting device illustrated in Fig. 1 consists of a lifting element 1 and a lifting mat 2 laid around a tube 3. The lifting element 1 is suspended from the lifting hook 4 of a hoisting crane and is in the form of a flat iron 5 which is fitted on each side with a number of hooks 6. The ends of the lifting mat 2 are provided with loops 7, the number of which corresponds to the number of hooks 6.

Fig. 2 illustrates the lifting hooks 6 of the lifting element 1 more clearly. As appears from this drawing figure, the hooks 6 on one side are formed with a wider opening or loop-receiving aperture than are the hooks on the opposite side. This is done in order to facilitate hooking-on and hooking-off of the lifting loops 7 at one end of the lifting mat while at the same time this arrangement ensures that the lifting loops at the opposite end of the mat are securely retained in position in the hooks when the lifting mat is applied around or is removed from the object to be lifted.

The lifting mat 2 illustrated in Fig. 3 is provided with a wrapping which is in the form of a doubled cloth 8 made from a water-repellant and wear-resistant material, preferably polyester or nylon-reinforced PVC plastics. The lengthwise marginal edges of the cloth are interconnected, preferably at the centre of the lifting mat, by means of a seam, which could be made either by welding or sewing or be some other suitable type of seam.

Elongate slings 9 made from parallel strands of synthetic fibre yarns are sandwiched between the walls of the cloth 8 in such a manner that a portion of each sling projects beyond the transverse marginal edges of the cloth, thus forming the lifting loops 7.

Lengthwise seams 10, formed by e.g. welding or sewing, interconnect the walls of the cloth 8, whereby channels 11 are formed which separate the individual slings 9 from each other. Each lifting loop 7 is provided with its individual protective covering 12 which is made from a woven synthetic-fibre cloth and is provided with a leather lining 13 in the areas of the loop intended to engage with the hooks 6.

Fig. 5 illustrates a second embodiment of the sling in accordance with the invention, according to which the wrapping consists of a number of hoses 14 forming the channels 11 of the wrapping. Lengthwise seams 15 interconnect the hoses in parallel relationship. As in the first embodiment, the slings extend lengthwise inside the channels 11 in such a manner that their ends protrude beyond the channels, forming the lifting loops 7 at the channel ends.

The third embodiment illustrated in Fig. 6 is distinguished from the previous embodiment only in that the hoses 14 are interconnected by means of straps 16 extending lengthwise intermediate neighbouring hoses. This embodiment makes it possible to manufacture lifting mats with identical lifting capacity but of different widths.

Because the synthetic-fibre yarns making up the

slings 9 are able to move freely inside the channels 11, the load is distributed more evenly over the fibers, with the result that the lifting mat as a whole is able to take heavier load in relation to its weight than do woven lifting mats of equivalent weight. Whereas loops of conventional fibrous webs extend in a line of engagement which is parallel to the plane of the lifting mat and therefore require the use of special members or locking means to attach the lifting loops to the lifting element, this is not necessary in the lifting mat in accordance with the subject invention. On the contrary, the lifting loops 7 on the mat may be hooked directly onto the hooks 6 formed on the lifting element 1. Because the wrapping encloses the strands forming the slings, the latter are protected from wear and from the detrimental effects of dirt and water. Worn-out patches of the wrapping are easily mended which can be done without impairing the strength of the lifting mat.

Fig. 6 shows the slings 9 fitted with a protective covering 12 that extends along the entire length of each sling. This arrangement gives the lifting mat additional wear resistance. Obviously, the slings 9 illustrated in Figs 3 and 5 could be similarly fitted with protective coverings of this kind.

The invention is not limited to the embodiments illustrated and described above but a number of modifications are possible within the scope of the appended claims. The lengthwise seams 10 need not extend along the entire length of the wrapping. The essential feature is that the slings 9 are kept separated from each other.

The invention is not either limited to be used in connection with tubes or rollers but could be used also to lift other objects, e.g. bulky commodity packages, such as sack loads.

CLAIMS

1. A lifting sling in the shape of a mat, particularly for lifting cylindrical objects such as pipes or rollers, characterised in that it is composed of two or more slings which are positioned side by side, each sling consisting of an elongate loop of parallel strands and extending inside its individual channel which channels are formed by a wrapping enclosing the slings, a portion of each sling protruding from its respective channel at each channel end, said protruding sling portions being individually enclosed by protective coverings and forming lifting loops.

2. A lifting mat as claimed in claim 1, characterised in that the wrapping is a doubled cloth, preferably made from polyester or nylon-reinforced PVC plastics, the longitudinal marginal edges of which are interconnected, the slings being sandwiched between the walls of the cloth in fixed relative positions.

3. A lifting mat as claimed in claim 1, characterised in that the wrapping consists of two or several hoses which are interconnected in parallel relationship by means of lengthwise seams and which enclose one sling each extending lengthwise in the hose.

4. A lifting mat as claimed in claim 3, characterised in that the hoses are interconnected by means of intermediate straps.

5. A lifting mat as claimed in any one of the pre-

ceding claims, characterised in that the protective covering extends along the entire length of each sling.

6. A lifting mat as claimed in any one of the preceding claims, characterised in that the sling portions serving as lifting loops are provided with a lining on the face of the covering turned towards the wrapping, said lining made from a comparatively rigid and wear-resistant material, such as leather.

7. A lifting mat constructed and arranged substantially as herein described and as shown in the Figures of the accompanying drawings.

8. A lifting sling constructed and arranged substantially as herein described and as shown in the Figures of the accompanying drawings.

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